Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Unlicensed Operation in the TV Broadcast Bands	)	ET Docket No. 04-186
	)	
	)	ET Docket No. 02-380
Additional Spectrum for Unlicensed Devices Below 900 MHz and in the 3 GHz Band	)	
	)	
	)	

To: The Commission

OPPOSITION TO PETITIONS FOR RECONSIDEATION

Cellular South, Inc. ("Cellular South"),[1] by its attorneys and pursuant to the FCC Rule Section 1.429, submits its comments on the petitions for reconsideration ("Petitions") filed to the Commission's *Second Memorandum Opinion and Order*, 25 FCC Rcd ____, 51 Comm. Reg (P&F) 578, FCC 10-174 (September 23, 2010) ("Second M&O"), in the above captioned proceeding.[2] As shown herein, those Petitions which seek to liberalize the interference protection rules the Commission adopted should be denied because they will increase the likelihood of interference to existing services in the television band and to Lower 700 MHz Band, Frequency Block A ("Lower Block A") licensees. To the extent the Commission were to adopt any of the reconsideration proposals to lessen interference protection, such action would be

[1] Cellular South is the nation's largest privately-held wireless carrier. It currently provides wireless services to some 850,000 customers throughout Mississippi and in portions of Alabama, Tennessee and Florida. Through its subsidiary, Cellular South Licenses, LLP, it holds licenses to operate wireless systems on Lower Block A, and recently announced its plans for building out some of those licenses. In effecting its build-out, it is facing potential interference from facilities which operate on television channel 51, directly adjacent to Lower Block A spectrum, including full service and low power television stations. It would face similar interference from the unlicensed TV band devices ("TVBD") authorized in this proceeding.

[2] Public Notice of the filing of the Petitions was published in the Federal Register on February 8, 2011. 75 FR 75813.

further reason to adopt the proposals set forth in Cellular South's separate Petition for Partial Reconsideration of the Second M&O.

I. Introduction.

In response to the Second M&O, five entities sought reconsideration. Cellular South, The National Cable & Telecommunications Association ("NCTA"), Wi-Fi Alliance ("Wi-Fi"), Motorola Solutions, Inc. ("Motorola"), and a coalition headed by the Wireless Internet Service Providers Association ("Joint Petitioners").

Cellular South requested the Commission to take the following three steps to assure that TVBDs will not interfere with Lower Block A wireless operations:

> --Provide for registration of Lower Block A base stations in the TV bands database;
>
> --Prohibit fixed TVBD operation on TV Channel 51; and
>
> --Limit personal/portable TVBD operation on TV Channel 51 to 40 mW and adopt the adjacent channel separation table in FCC Rule Section 15.712(a)(2) as the minimum distance to Lower Block A base station coordinates for personal/portable TVBDs.

These three steps are designed to provide Lower Block A wireless systems with protection equivalent to that granted to other TV band incumbents in light that Lower Block A systems are directly adjacent to TV Channel 51 throughout the nation.

NCTA requests the Commission to reconsider its decision to make all data contained in the TV bands database publicly available, specifically noting that the geographic coordinates of receive sites such as cable headends are critical infrastructure. NCTA points out that making critical infrastructure location information readily accessible increases the risk of sabotage. NCTA's point is well taken and its Petition should be granted; however, for the same reasons NCTA explains in its Petition, the prohibition on public release should apply to all telecommunications receive sites contained in the TV bands database, not just to cable headends.

These sites all represent critical infrastructure the security of which would be enhanced by restricting unfettered access to their location information.

Motorola requests the Commission to relax the out-of-band emission ("OOBE") limits for fixed devices and compensate with greater distance separation to provide equivalent protection to incumbent services. Wi-FI also seeks to liberalize the OOBE mask for devices capable of controlling their transmit power. Wi-Fi Petition at 3. In addition, Wi-Fi seeks to allow fixed devices to operate indoors within the adjacent channel contours of protected TV facilities with the power and spectral density limits of personal/portable devices. Finally, Wi-Fi proposes to allow operation of personal/portable devices – and presumably the indoor fixed devices referenced above – at a level of -25.dBm/100 KHz where the transmitted power is 100mW EIRP or less without regard to the 72.8 dB OOBE emission mask within urban and suburban areas. Wi-Fi Petition at 4

The Joint Petitioners, echoing Motorola, would relax the OOBE mask for all fixed devices from -72.8 dBr to -47.8 dBr and increase adjacent channel separation distance to compensate. Joint Petitioners at 8. As a fallback, Joint Petitioners would create a second class of fixed TVBDs with an OOBE mask of -47 dBr to afford flexibility to white space device manufacturers. *Id.* at 9.

Joint Petitioners would also relax the 76 meter HAAT limit for fixed TVBDs and eliminate the antenna height above ground (AGL) level restrictions for those devices. Joint Petitioners would replace those restrictions with an antenna height restriction of 250 meters HAAT and make corresponding changes (increases) in geographic separation distances to maintain interference protection. *Id.* at 3-7.

As we show below, each of the proposals of Motorola, Wi-Fi and the Joint Petitioners would create increased potential for interference to protected operations, especially to Lower

Block A wireless systems. None of these proposals can be granted without at a minimum adopting the interference protection mechanisms Cellular South requested in its Petition for Partial Reconsideration, and some would still threaten Lower Block A systems and other protected incumbents even with the protections Cellular South requested.

II. The Commission should decline to relax the OOBE mask for TVBD devices without ensuring protection for Lower Block A wireless systems.

The Commission should deny the three requests to relax the OOBE mask absent providing for adequate protection of Lower Block A wireless systems. The OOBE limitation is designed to protect adjacent channel operations from interference. Relaxing that restriction will result in relaxing interference protection, especially to Lower Block A systems, which already would suffer interference from TVBDs operating on TV Channel 51. None of the Petitioners address how their proposals would affect Lower Block A systems. The proposals to increase separation distance from adjacent channel protected contours suggested by Motorola and Joint Petitioners to compensate for a more liberal OOBE would not prevent interference to Lower Block A wireless systems since they are authorized throughout the United States. The only separation distance that makes sense to protect Lower Block A systems is to prohibit fixed operation on Channel 51 altogether. Moreover, relaxation of the OOBE mask would require consideration of the effects on 2nd and 3rd adjacent channel operations as well as 1st adjacent incumbents.

Attached herewith is the Engineering Statement of Clarence M. Beverage. Mr. Beverage's qualifications are a matter of record before this Commission. He notes that Motorola "proposes that the adjacent channel OOBE limit be increased from -72.8 dBr to -47.8 dBr representing a 25 dB increase in allowable out of band radiation. This is a significant (316 times more power) increase in OOBE and would impact Channel 52 [Lower Block A] base station operation by TVBD operation not just on CH 51 but also CH 50 and CH 49." This is because

"the OOBE emissions attenuated only 47.8 dBr are strong enough to potentially impact 2nd and 3rd adjacent channels as well as 1st adjacent channels...." Mr. Beverage explains that FCC Rule Section 15.709(c)(3) requires:

> "At frequencies beyond the television channels immediately adjacent to the channel in which the TVBD is operating, the radiated emissions from TVBDs shall meet the requirements of §15.209." Section 15.209(a) sets the limit on radiated emission in the UHF TV band at 200 uV/m at a distance of 3 meters from the radiator, which is equivalent to -61 dBm. **CS** stated in its Petition For Partial Reconsideration that the in-band interference level limit, as established by equipment manufacturers, is -114.5 dBm. Based on free space loss calculations, a CH 51 TVBD signal must be attenuated an additional 53.5 dB, requiring a distance separation of 54 feet from a TVBD employing the Motorola proposed, relaxed, emission mask. This additional separation is not necessary if the FCC maintains the adopted 72.8 dB attenuation value for adjacent channels. The reason is that a ten section mask filter would typically be expected to be required to achieve this level of attenuation. Adequate OOBE attenuation of CH 49 and 50 signals in the CH 52 spectrum would be expected when this type of filter is employed.

In his Engineering Statement, Mr. Beverage refers to Motorola's observation that "land mobile services operating on TV Channel 14-20 are protected from 1st adjacent channel TVBD operation by a 131 kM separation requirement." On that point Mr. Beverage comments that "Logic would indicate that should the Commission decide to relax the OOBE mask as proposed by Motorola then fixed TVBD operation on Channels 49-51 should be prohibited for devices operating with the relaxed mask in order to protect Lower 700 MHz Block A operations. Additional adjacent 2nd and 3rd channel protection for land mobile operations on TV Channels 14-20 would also be in order."

Mr. Beverage also addressed Motorola's arguments in support of relaxing the OOBE limitations:

> Motorola states that network capacity is limited by the mask requirements and that there are cost penalties associated with the current narrow mask. This may be true at this point where very little effort has been made in the design and testing of TVBDs. Motorola overlooks the likelihood that as technology continues to evolve, these problems will be surmounted to the betterment of the industry as a whole.

Only if the Commission accepts Cellular South's proposals advanced in its Reconsideration Petition, including its proposal to prohibit fixed TVBDs on Channel 51 *and* provides additional second and third adjacent channel interference protection, would the proposals to relax the OOBE for fixed TVBDs not threaten increased interference to Lower Block A systems. Moreover, as Mr. Beverage explains, additional protection would be required for land mobile operations on Channel 14-20, and likely for second and third adjacent television operation as well.

Even then, however, there remains the issue of personal/portable TVBDs, for which Wi-Fi would also relax the OOBE mask for devices operating at 100mW EIRP or below. In its Reconsideration Petition, Cellular South proposed to limit personal/portable TVBDs operating on TV channel 51 to 40 mW EIRP consistent with the Commission's limitation for such devices operating within the service contour of an adjacent TV station and to apply the distance separation requirement of FCC Rule Section 15.712(a)(2) to personal/portable operation on Channel 51. Adoption of Wi-Fi's proposal would require not only adoption of Cellular South's proposals with respect to personal/portable operation, but would require additional distance separation of these devices from Lower Block A facilities beyond that contained in FCC Rule Section 15.712(a)(2) to compensate for the increased OOBE generated. Furthermore, similar limitations would be required on second and third adjacent channels in light of Mr. Beverage's analysis concerning Motorola's proposal to relax the OOBE limitations for fixed TVBD devices.

On balance then, adoption of the requests to liberalize the OOBE limits for TVBDs would significantly increase interference to Lower Block A systems and other protected

incumbents in the TV bands. As such, the Commission should deny reconsideration of this requirement and maintain the OOBE limit at -72.8 dBr.[3]

III. Other proposals to liberalize TVBD operating parameters threaten to increase interference to incumbent licensees.

Although there is some merit to its position, similar concerns arise with respect to Joint Petitioners' proposal to relax the height restrictions on fixed TVBD operation. Joint Petitioners would increase the allowable antenna HAAT of fixed TVBDs to 250 meters. Cellular South opposes this particular proposal, but would not oppose allowing a height above ground level ("AGL") limit of 30 meters where HAAT exceeds 76 meters.

As Mr. Beverage explains in his attached Engineering Statement:

> The Association does raise an interesting point through its demonstration that portions of the country are precluded from fixed TVBD operation by the requirement that the ground level HAAT not exceed 76 meters. The proposed solution is to allow a maximum HAAT of 250 meters at all locations in the United States. A simpler solution, and one with far less interference potential, would be to limit antenna elevation AGL at sites with a ground HAAT in excess of 76 meters to 30 meters. The 30 meter AGL solution is believed superior for several reasons. First, it removes the current preclusion for fixed TVBD operation at locations in the United States where the ground elevation HAAT exceeds 76 meters. Second, and most important, it limits the potential for widespread interference in the bulk of the country (see the Association's Appendix B) where the ground elevation HAAT does not exceed 76 meters but the Association proposes that the HAAT can be as great as 250 meters. Operation with a HAAT in excess of 76 meters in low flat areas can significantly extend the interfering contour beyond the 16.1 kM radius in which terrain is considered in calculating HAAT. As an example, a 25 dBu F(50,10) interfering contour for a 4 watt ERP on UHF TV Channels extends out 31.3 kilometers for a 76 meter HAAT and 48.8 kM for a 250 meter HAAT. Third, in areas where the ground elevation is greater than 76 meters the HAAT on a number of radials is expected to be negative. Further, due to the rough nature of the terrain, even though some radials may show significant HAAT values, there is typically terrain blockage (non-line of sight transmission) resulting in less propagation distance than the HAAT method

[3] Cellular South notes that Motorola posits an alternative approach that the FCC could "create a new class of fixed TVBD that would utilize the relaxed spectral level and be subject to the greater separation distances outside the protected adjacent channel TV contour." Motorola Petition at 8. To the extent and only to the extent such a new class of TVBDs were restricted from operation in TV Channels 49-51, their operation would appear not to adversely impact Lower Block A wireless systems.

> predicts. It is noted that restricting antenna elevation to no more than 30 meters is believed crucial to limiting interference.

In light of Mr. Beverage's analysis, Cellular South would support his alternative proposal to relax the fixed TVBD height restriction. However, Cellular South stresses that unless the FCC adopts its proposal to prohibit fixed TVBDs on Channel 51, there would be a corresponding increase in interference to Lower Block A wireless systems by any relaxation of fixed TVBD height limitations. Merely increasing the separation distance from protected adjacent channel contours as Joint Petitioners recommend simply does nothing to protect Lower Block A wireless systems because, as noted above, Lower Block A systems are authorized throughout the United States. Any fixed TVBD operating on Channel 51 is likely to be a source of interference to Lower Block A transmitter sites. More problematic is Wi-Fi's proposal to allow indoor fixed TVBD operation with the power and spectral density limits of personal/portable devices within the adjacent channel contours of protected facilities in urban and suburban environments without location capability. Without location capability these devices could cause destructive interference to protected co-channel and adjacent channel facilities. As Mr. Beverage's attached Engineering Statement explains:

> The proposal to allow Personal/Portable devices to operate on adjacent channels in urban and suburban areas suggests that these devices be allowed to operate inside the protected contours of television broadcast stations. This proposal appears unmanageable as there is no precise definition of what constitutes urban and suburban environments. More importantly the proposal fails to recognize that TV signals are significantly reduced by the attenuation of surrounding structures making them more susceptible to interference.

Mr. Beverage goes on to say:

> Further … any operation on CH 51 at a power level in excess of 40 mW is likely to be a source of significant impermissible interference to Lower 700 MHz Block A base stations operating in the CH 52 spectrum. Devices operating with a power of 40 mW or less need to be at least 0.1 kilometer or more from a registered base station location.

> The Wi-Fi Alliance admits that GPS devices cannot be relied upon to accurately identify the location of a Mode II Device, [stating] "But more likely, insufficient satellite signal detection will make the required geo-location information impossible to discern." It is believed that the likely result of allowing these devices to operate within adjacent channel contours without location controls will be to cause destructive interference.

Given that Wi-Fi's proposal is likely to cause interference throughout the Television band and into the Lower 700 MHz band, its reconsideration petition should be denied.

IV. Conclusion.

As set forth above and in Cellular South's separate Petition, the Commission should reconsider the Second M&O to afford Lower Block A wireless systems with equivalent adjacent channel interference protection to that enjoyed by other TV band incumbents. Fixed TVBDs should be prohibited from operating on television channel 51, which is adjacent to Lower Block A base receive facilities. Personal/portable devices should be limited to 40 mW EIRP and be subject to the adjacent channel separation criteria set forth in FCC Rule Section 15.712(a)(2). Lower Block A base stations should be allowed to register in the TV bands database so that TVBDs may afford them the required separation protection. In the absence of taking these steps, grant of any of the proposals set forth in the Petitions for Reconsideration filed by Motorola, Wi-Fi and Joint Petitioners will exacerbate the interference Lower Block A wireless systems and other TV band incumbents will experience.

In sum, proposals to liberalize restrictions on TVBD operations threaten to increase interference to TV band incumbents, especially interference from TVBD operation on Channel 51 toward Lower Block A systems. For these reasons, the Commission should deny the reconsideration petitions of Motorola, Wi-Fi and the Joint Petitioners. If the Commission grants Cellular South's reconsideration Petition in all respects and provides Lower Block A systems equivalent interference protection to that enjoyed by other TV band incumbents, then a relaxation of the height restrictions for fixed devices, allowing them to be located up to 30

meters above ground level when their HAAT exceeds 76 meters, would be a reasonable accommodation to Joint Petitioners' concern that large areas of the country would otherwise be precluded from TVBD operation. However, the proposals to relax the OOBE limitations and the Wi-Fi proposal to allow fixed indoor TVBDs to operate with the power and spectral density limits of personal/portable devices within the adjacent channel contours of protected TV facilities without location capability would remain problematic. Those proposals should be denied.

CELLULAR SOUTH, INC.

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